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EXAMINER

STAHL, MICHAEL J

ART UNIT PAPER NUMBER

2874

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/681,019

Applicant(s)

ODA ET AL.

Examiner

Mike Stahl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23, 26-34 and 37-40 is/are rejected.
- 7) ☒ Claim(s) 24, 25, 35 and 36 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09796257.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date see action.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Information Disclosure Statement

The various information disclosure statements filed to date have been considered. The citation form of the May 27 2004 statement was lined through because the same reference was cited in the May 20 2004 statement. The citation form of the March 4 2004 statement was lined through because it is a copy of a form from a different application. However, it is noted that the listed reference was already cited in the October 8 2003 statement. The March 4 2004 statement also refers to three US patent references which were allegedly listed on an attached 1449 form. Since that form could not be located, the examiner has listed those references on the 892 form attached to this action.

Specification

The specification is objected to for the following informality: At p. 26 line 21, "Fig. 5B" should be changed to "Fig. 9B".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6-7, 9-12, 15-16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Albrecht et al. (US 5221415).

Claim 1: Albrecht discloses a mirror comprising a multi-layer thin film having first and second layers, wherein the first layer **42** has a reflection surface plane, the second layer **20** has a contact plane with a substrate **40**, and an angle between the reflection surface plane and the contact surface plane is equal to an angle between the (100) and (111) plane orientations of silicon. See fig. 14 and col. 3 ln. 48 – col. 4 ln. 68.

Claim 2: The mirror comprises a gold film (col. 4 lns. 64-68).

Claim 3: The mirror has a concave portion which is filled with a material. In one interpretation, the material of substrate **40** fills a concave portion defined by layer **42**. In an alternate interpretation, the concave portion within the V-shaped groove is filled with air.

Claim 6: The mirror has a shape of a pyramid (col. 3 lns. 45-47).

Claim 7: The reflection surface plane is flat.

Claim 9: The mirror further includes a connection film portion which is orthogonal to an optical axis.

Claims 10-12, 15-16, and 18: The limitations of these claims are met by the Albrecht device described above.

Claims 1-3, 6-12, and 15-18 are rejected under 35 U.S.C. 102(a) as being anticipated by Shimada et al. (US 5923637).

Claim 1: Shimada discloses a mirror **29** comprising a multi-layer thin film having first and second layers, wherein the first layer has a reflection surface plane, the second layer has a contact plane with a substrate, and an angle between the reflection surface plane and the contact surface plane is equal to an angle between the (100) and (111) plane orientations of silicon. See fig. 14(g) and col. 21 ln. 24 – col. 22 ln. 35.

Claim 2: The mirror comprises a gold film **27**.

Claim 3: The mirror has a concave portion which is filled with a material. In particular, it is considered inherent that the interior of the pyramid structure between layers **26** and **27** contains air.

Claim 6: The mirror has a shape of a pyramid.

Claim 7: The reflection surface plane is flat.

Claim 8: In an alternate embodiment (fig. 3(e) for example), the reflection surface plane is a curved recess surface.

Claim 9: The mirror further includes a connection film portion which is orthogonal to an optical axis.

Claims 10-12, 15-18: The limitations of these claims are met by the Shimada device described above.

Claims 1-3, 6-7, 9-12, 15-16, 18-19, 22-23, 26-27, 29-30, 33-34, 37-38, and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimada et al. (US 6201226).

Claim 1: Shimada discloses a mirror comprising a multi-layer thin film having first and second layers, wherein the first layer has a reflection surface plane, the second layer has a

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contact plane with a substrate, and an angle between the reflection surface plane and the contact surface plane is equal to an angle between the (100) and (111) plane orientations of silicon. See figs. 3A-3G.

Claim 2: The mirror comprises a gold film 7.

Claim 3: The mirror has a concave portion which is filled with a material. In particular, it is considered inherent that the interior of the pyramid structure between layer 8 and waveguide 28 contains air.

Claim 6: The mirror has a shape of a pyramid.

Claim 7: The reflection surface plane is flat.

Claim 9: The mirror further includes a connection film portion which is orthogonal to an optical axis.

Claims 10-12, 15-16, and 18: The limitations of these claims are met by the Shimada device described above.

Claims 19 and 30: Shimada discloses an optical circuit having the claimed mirror structure as described above, and further having a substrate 21 to which the mirror is connected, an optical waveguide 28 provided for the substrate, and a photodiode 19 (shown in figs. 5 and 9A) provided for the substrate.

Claims 22-23, 26-27, 29, 33-34, 37-38, and 40: The features of these claims have been identified in the Shimada reference as set forth above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4-5 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US 5923637).

Claims 4 and 13: In an alternate embodiment (fig. 20(d)), the mirror has a concave portion which is filled with polyimide material 309. It is not stated whether the polyimide is UV-curable. However, UV-curable polyimides are known in the art. It would have been obvious to a skilled person to have used a UV-curable polyimide in the Shimada process since this would avoid the need to provide equipment such as an oven for thermal curing.

Claims 5 and 14: Polyimide is a biphenyl-type resin.

Claims 20-21 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US 6201226) in view of Miyazaki et al. (US 5187367).

Claims 20 and 31: Shimada discloses that the substrate includes a cantilever and that the mirror is installed in a tip portion of the cantilever, but does not disclose the recited expanding/contracting member to move the tip portion up and down. Miyazaki discloses a cantilever probe similar to that of Shimada, the probe including a member 305/305' which expands or contracts to move the cantilever up or down (figs. 7A-8B). The purpose of enabling movement of the cantilever is to control the distance between the probe and a sample (col. 1 ln. 63 – col. 2 ln. 11). Shimada also recognizes a need to control this distance (col. 5 ln. 61 – col. 6 ln. 10). Accordingly, it would have been obvious to a skilled person to have incorporated the expanding/contracting member taught by Miyazaki into the Shimada device in order to provide more direct control over the position of the cantilever tip.

Claims 21 and 32: The member 305/305' suggested by Miyazaki is a piezoelectric element.

Claims 8, 17, 28, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US 6201226) in view of Shimada et al. (US 5923637).

Shimada '226 does not disclose that the reflection surface plane is a curved recess surface. Shimada '637 discloses a similar probe which is formed to have a curved recess surface (fig. 3), and teaches that this shape resists deformation upon contact with a sample surface (col. 10 lns. 23-27). Since the probe of Shimada '226 may contact a sample, it would have been

obvious to a skilled person to have formed the probe in Shimada '226 with the general shape suggested by Shimada '637 in order to avoid deformation of the probe.

Allowable Subject Matter

Claims 24-25 and 35-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. It is noted that Shimada '226 is the only reference applied to parent claims 19, 23, 30, and 34. Shimada '226 does not teach or suggest filling a concave portion of the mirror with the recited material.

Conclusion

The additional references listed on the attached PTO-892 form are considered relevant to this application.

Inquiries about this letter should be directed to Mike Stahl at 571-272-2360. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the technical support staff supervisor at 571-272-1626. Official communications which are eligible for submission by facsimile and which pertain to this application may be faxed to 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MSS

Mike Stahl
Patent Examiner
Art Unit 2874

July 13, 2005



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